

## Report on the slag assemblage from Sewerby Cottage Farm, Bridlington, (OSA02EX09)

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### Introduction

The site lies on the northern outskirts of Bridlington and a programme of archaeological work has been ongoing there since 1999 in advance of a residential development. The two fields involved have been the subject of geophysical survey, trial trenching and excavation, which has revealed Neolithic features, barrows with associated enclosures and a late Iron Age - Romano-British ladder settlement. The 2002 evaluation targeted the part of the site with the barrows and ladder settlement and evidence for occupation was found in the form of linear ditches, postholes, pits and gullies. Most of these were associated with late Iron Age and Romano-British pottery (Phase 3), the two types being found alongside each other, thus the assignment of the early Roman date. Most of the slag was from Phase 3 contexts

### Recording Methodology

The slag from the site has been washed, identified and recorded on *pro forma* recording sheets. Each piece was visually examined and identified solely on morphological grounds, sometimes with the aid of a x10 binocular microscope. The records were entered into a Microsoft Access database and the entries consist of the following encoded fields: Context; Sample Number; Type; Count; Weight; Craft; Fuel; Comments. A note of probable fuel type has been recorded when fragments were incorporated within the slags. The complete catalogue forms Appendix 1.

### Description of the slag

The slag from the site forms a single distinctive group. All of it is the by-product of iron smithing - the forging of objects, their repair or the recycling of iron. The slags are generally in a fresh condition, with no signs of abrasion that would suggest ground surface weathering or redeposition. The characteristics of this assemblage is the small size of the individual pieces (most are complete), their knobby form and that they are quite dense and not particularly cindery even though coal was the sole fuel used.

**Table 1. Summary of the evidence by context**

Cont	Iron-smithing slags					Miscellaneous categories					
	Hamm	HB	Proto HB	Slag	SSL	Coal	Ironst	Slag*	Stone	Tuy	Other
3119									1 5g		
3258				3 1g	1 1g	6 1g	1 19g	3 1g	3 1g		Glass Iron
3364							1 17g				
3606	1										
3654							2 6g				
3718						1 1g	8 18g	11 1g			
3910		1 125g									

3941		1 8g	1 21g					1 2g	1 20g		
3947											IAGrey
4153		1 13g									
4177			5 140g		23 111g			1 1g		1 21g	
4179	10+	4 237g	8 127g	?#80g	128 278g	10 2g				1 6g	Iron

\* Pieces too small to confirm they are a smithing by-product. # Tiny fragments that were not counted

CODES USED IN THE ABOVE TABLE.

Cont.	Context.	Ironst	Ironstone.
Hamm	Hammerscale.	SSL	Smithing-slag lumps.
HB	Plano-convex slag accumulations (commonly known as hearth bottoms).	Tuy	Tuyere.

Most of the slag has been categorized as smithing-slag lumps but some of these may be very small proto plano-convex slag accumulations (commonly known as hearth bottoms) because all the hearth bottoms from the site are very small. They are also not the classic plano-convex shape and are fairly variable in form, which makes their identification more difficult. A high percentage of the individual pieces are complete and most are a reddish-brown colour although a few are various shades of grey. Only a few are magnetic suggesting that most of the iron present in slag is in the form of wustite (FeO) and that they have only a very small magnetite (Fe<sup>3</sup>O<sup>4</sup>) or metallic iron content. Some hammerscale is present, with a number of large pieces being recovered from Context 4179 (Sample 118). Coal was the sole fuel used for the iron smithing. The County Durham and related coal fields are one of the few in Britain that are suitable for iron smithing because they do not have a sulphur content.

The two fragments of tuyere are likely to be related to the iron smithing. The largest piece (Context 4177, Sample 117) has the remains of the semi-circular air hole, which has an approximate diameter of 15-20mm.

The small piece of Iron Age Grey slag will have been produced during the late Iron Age. This piece is typical of this slag type, which we know was formed at very high temperatures (bellows would have been required) but how and why they were generated and exclusively at this date, is not known (Cowgill *et al* 2001).

Discussion

Most of this assemblage was recovered from the samples taken on site. The small size of much of the slag would have made hand recovery difficult and therefore it is possible that there may be a bias in the distribution of the slag on the site. Most of the slag, however, was recovered from just one pit (4178 with 4178 being an earlier cut) with small quantities of the same assemblage being found in Ditch 3943 (Cut by Pit 4178) and Layer 4153. The majority of the hammerscale was also from this pit and the fact that some of it is large suggests that it was deposited in this feature directly from floor of the area that was being used as a smithy. The pit was found in the eastern part of Area B (the zone to the north of the hedge that divided the site). There, a number of postholes and small pits were found close to the baulk and it is thought that they probable represent at least one post-built structure which extends under the baulk to the south. It is likely that a smith operated for a short period of time in the area. The slags may represent weeks rather than days worth of debris, although this is impossible to quantify because the by-products of different smiths vary so greatly. Although the pit fills and ditch fill are stratigraphically sequential the slag is almost

certainly the smithing debris from a single smith and perhaps they were itinerant and visited the settlement on a number of occasions but always smithed close to this location. The fresh condition of the slag argues against redeposition in the later cuts/features.

The small size of the slag suggests an Iron Age or very early Romano-British date for the assemblage. Romano-British hearth bottoms tend to be very large (often over 1kg in weight) and the associated slags are also large. This assemblage suggests a cautious skilled smith who was careful to lose a minimal amount of iron into the slag and that the iron being smithed was either expensive or difficult to obtain (probably both). The larger and heavier the slag the greater the quantity of iron that has been lost into it during the forging (fayalite [2FeO. SiO<sub>2</sub>] the iron silicate that is slag often contains more than 50% iron).

The single small piece of Iron Age Grey slag is from Ditch 3948 and the fragile nature of this slag type would again suggest limited reworking of this piece.

## Conclusion

A small assemblage of iron smithing slag has been recovered from the site and the close association of the features from which it was recovered suggests that the smithy was located in this area. The slags are probably the by-product of a single smith because they are so similar in appearance, but because the contexts in which the slags were found are in a stratigraphical sequence, it suggests perhaps more than one visit by a single smith. Coal was the only fuel used and this was probably obtained fairly locally.

## Bibliography

Cowgill, Jane, Mack, I, and McDonnell, J.G., 2001, 'Report on the slags and related material from Grange Park, Courteenhall, Northants (GPC 99)', Publication report produced for Birmingham University Field Unit.

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## Appendix 1. The catalogue of the slag and associated finds from Sewerby Cottage Farm, Bridlington.

Context	Sample	Type	No	Weight	Craft	Fuel	Comments
	3119	0 STONE	1	5			BLACK QUARTZ
	3258	19 COAL	6	1			
	3258	19 GLASS	1	1			MOLTEN GREENISH LUMP
	3258	19 IRON	1	1			OBJECT FRAG
	3258	19 IRONST	1	19			MAGNETIC; CRACKING
	3258	19 SLAG	3	1			
	3258	19 SLAG	3	1	FESMITH		MAGNETIC
	3258	19 SSL	1	1	FESMITH		
	3258	19 STONE	3	1			BLACK QUARTZ
	3364	0 IRONST	1	17			NATURAL - DISCARD
	3606	46 HAMMS	1	0	FESMITH		PLATE
	3654	64 IRONST	2	6			NATURAL - DISCARD
	3718	67 COAL	1	1			
	3718	67 IRONST	8	18			PAN AND STONES; NATURAL - DISCARD
	3718	67 SLAG	11	1			CINDERY
	3910	122 HB	1	125	FESMITH	COAL	SMASHED - MOST MISSING; DENSEST PART MAGNETIC; CINDERY; LOTS SAND INCL; +HL
	3941	0 HB	1	8	FESMITH		DENSE FRAG - MOST MISSING
	3941	0 PROTOHB	1	21	FESMITH	COAL	MID BROWN; KNOBBLY
	3941	0 SLAG	1	2			GREY/GREENISH FRAG; FLINT INCL
	3941	0 STONE	1	20			BLACK QUARTZ
	3947	121 IAGREY	1	5			GREENISH; VERY GLASSY
	4153	0 HB	1	13	FESMITH		BROWN FRAG; QUITE DENSE; SOME MISSING
	4177	117 PROTOHB	5	140	FESMITH	COAL	MID REDDISH BROWN; KNOBBLY; 35X50X15; 30X40X20; 40X50X25MM
	4177	117 SLAG	1	1			IRON? MAGNETIC
	4177	117 SSL	1	3	FESMITH		+ HL
	4177	117 SSL	1	9	FESMITH		LIGHT GREY FLOW; + HL
	4177	117 SSL	21	99	FESMITH	COAL	MID BROWN; SOME DENSE SOME CINDERY; MOST COMPLETE; VERY SMALL HBS? IRREGULAR SHAPES

Context	Sample	Type	No	Weight	Craft	Fuel	Comments
4177	117	TUY	1	21			FRESH BREAKS; SEMI-CIRCULAR AIR HOLE C. 15-20MM DIAMETER; MAX THICKNESS 9MM
4179	0	HB	1	71	FESMITH	COAL	40X65X35MM; KNOBBLY; MID REDDISH BROWN
4179	0	TUY	1	6			PURPLE BACK; MAX THICKNESS 12MM; ALL BREAKS FRESH
4179	118	COAL	10	2			SMALL FRAGS
4179	118	HAMMS	0	0	FESMITH		11 PLATE - SOME LARGE; 2 SPHEROIDAL; TINY HAMMS IN SOIL
4179	118	HB	1	34	FESMITH	COAL	REDDISH BROWN
4179	118	HB	1	55	FESMITH	COAL	45X70X30MM; VERY KNOBBLY; NO TOP; LARGE SSL?
4179	118	HB	1	77	FESMITH	COAL	LIGHT- DARK GREY
4179	118	IRON	13	37			IRON OBJECTS/ OFFCUTS
4179	118	PROTOHB	8	127	FESMITH	COAL	7 COMPLETE; BROWN; VARIED SHAPES; 45X25X15; 50X15X25; 30X40X20; 30X35X25; 25X35X15; 30X20X15MM
4179	118	SLAG	0	10	FESMITH		LOTS OF TINY MAGNETIC FRAGS
4179	118	SLAG	0	70	FESMITH	COAL	LOTS OF TINY FRAGS; NOT COUNTED
4179	118	SSL	1	5	FESMITH		LIGHT GREY; + HL
4179	118	SSL	16	30	FESMITH		SOME DENSE; SOME MORE CINDERY; MAGNETIC
4179	118	SSL	111	243	FESMITH	COAL	SOME DENSE; SOME CINDERY; MOST MID BROWN; FEW GREY; MANY COMPLETE; KNOBBLY

### CODES USED IN THE ABOVE CATALOGUE

FESMITH	Iron-smithing slag.	TUY	Tuyere.
FRAG	Fragment.	+	And
HAMMS	Hammerscale.		
HB	Plano-convex slag accumulations (commonly known as hearth bottoms).		
HL	Hearth lining.		
IAGREY	Iron-Age Grey slag.		
INCL	Inclusions.		
IRONST	Ironstone.		
MAX	Maximum.		
SSL	Smithing-slag lumps.		